CORRELLIANA (MYRSINACEAE), A NEW PALMOID GENUS OF THE TROPICAL RAIN FOREST[1]

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Abstract

Correlliana, a new genus, is distinguished from specimens confused with *Clavija* and species confused with *Weigeltia*. The singular growth form, resembling a street lamp on a post, is widespread in tropical rainforests both on continents and islands, and may have evolved in different cases from forest trees or from herbaceous ancestors.

Trees or shrubs which consist of a more or less unbranched, straight trunk and a shock of leaves clustered at the top are referred to in the German literature as *Schopfbaüme* and have been referred to in English as rosette trees or scapose trees, the scape being beneath the rosette instead of above it as in scapose or rosette herbs. The growth form is sometimes simply called palm-like. It is effected not only by true palms but also by many species of dicotyledons. Most palms have compound or digitately dissected leaves as do many palmoid dicots (*Carica*), but in an interesting group of palmoid dicots the leaves are large, narrow, entire or nearly so, and the trees resemble street lamp posts in form. Richards (1966) has noted that this growth form is "fitted only for a permanently favorable environment," and this sort of environment occurs in the tropical rain forest and on some tropical islands. The genus described here evokes some speculation on the palmoid dicots with this street lamp-like growth.

The Genus *Correlliana*

While preparing the treatment of the Theophrastaceae for the *Flora of Panama*, a number of collections came to me tentatively identified as *Clavija*, a mainly palmoid genus of tropical American rain forests. These turned out, upon examination, to belong to the Myrsinaceae, and to a group which hitherto has been confused with *Weigeltia*.

Correlliana D'Arcy, *genus novum*

Type species: *C. spectabilis* (Standl.) D'Arcy.
Weigeltia sect. *Triadophora* Mez *in* Engler, Pflanzenr. 9(IV.236): 291. 1902. Type species: *W. schlimii* (Hook. f.) Mez.

Frutices simplices, foliis grandis, striatis fibris sclerenchymatibus subepidermalibus, floribus 3-merus, fructibus baccatis.

Dioecious, mostly unbranched *shrubs*. *Leaves* large, elliptical to spatulate, entire or serrate margined, coriaceous, pinnately nerved, glabrate, sometimes with minute, scattered gland-like trichomes(?), one or both sides with a well developed subepidermal layer of elongate sclerenchyma fibres running acropetally at an angle slightly flatter than the major veins. *Inflorescence* racemose-

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paniculate, arising terminally, those of the staminate plants slender with short branches, those of the pistillate plants half as long, congested, with longer branches, foliaceous bracts mostly lacking evident subepidermal fibres, the main rachis mostly flattened, sometimes longitudinally grooved, scale-like bractlets present or not. *Flowers* small, 3-merous, the sepals imbricate, drying dark; corolla rotate, deeply lobed, black punctate, the lobes exceeding the calyx; stamens inserted at the top of the corolla tube, filaments short, stout, flattened and narrowing upwards, somewhat longer and more slender in staminate plants, the anthers cordate; ovary napiform, the style short but distinct, the stigmas 3, irregularly expanded, the gynoecium rudimentary in staminate plants. *Fruit* a baccate drupe, globose, apiculate, red; seed 1, hard, globose with a large spheroidal basal excavation; the embryo starchy, circinnate across the basal excavation and compressed against the testa at the top of the seed.

Correlliana is distinct in its 3-parted flowers which are larger than those of *Weigeltia*, in its leaflike bracts, and in the Theophrastaceae-like layer of subepidermal fibres (Fig. 4) on the foliar, but not the floral leaves. These fibres, which appear as striations on the leaf surface, are plainly visible under a hand lens. The wood shows a tendency to break at right angles to the stem and display a radial pattern at the fracture, but this is not so clearly developed as in *Clavija*. The black, glandular spots on the corolla and the curved embryo surmounting the top of the seed cavity place the genus clearly in the Myrsinaceae.

Correlliana takes its name from Donovan S. Correll, a well known and respected American botanist who has made important contributions to both professional and popular aspects of systematic botany.

Hooker (1876) described three species under the genus *Comomyrsine*, one of which is *Correlliana schlimii*. Following Mez's (1902) treatment of the Myrsinaceae, one of the other two species must be chosen to typify *Comomyrsine*, and I select *C. sprucei* Hook. f. as lectotype. Mez considered both *C. sprucei* and *C. simplex* Hook. f., the third species, to be species of *Weigeltia*, and photos of the type specimens of these two species at Missouri (MO) look remarkably like *W. panamensis* (Standl.) Lundell, a true species of *Weigeltia* with 4–5-merous flowers and no sclerenchyma fibres in the leaves. Dr. Peter Goldblatt, Missouri Botanical Garden, kindly examined the type material of these two species of *Comomyrsine* or *Weigeltia* and reported: "I checked the types you asked me about. I am certain that neither has the striations [sclerenchyma fibres] on either leaf surface. The types are by the way the only specimens of either taxon at Kew."

Correlliana apparently embraces several species, and the following transfers are required. The position of *C. chamaephyta* is uncertain. In addition a variety of *C. schlimii*, var. *intermedia*, was described by Moldenke (1947).

Correlliana spectabilis (Standl.) D'Arcy, *comb. nov.*

Ardisia spectabilis Standl., Publ. Field Mus. Nat. Hist., Bot. Ser. 18: 893. 1938.
Weigeltia triandrae Asplund, Bot. Not. 1939: 802, *t.* 5, *a–d*, 5. 1939.

C. schlimii (Hook. f.) D'Arcy, *comb. nov.*

Comomyrsine schlimii Hook. f., Gen. Pl. 2: 644. 1876.
Weigeltia schlimii (Hook. f.) Mez *in* Engler, Pflanzenr. 9(IV.236): 291. 1902.


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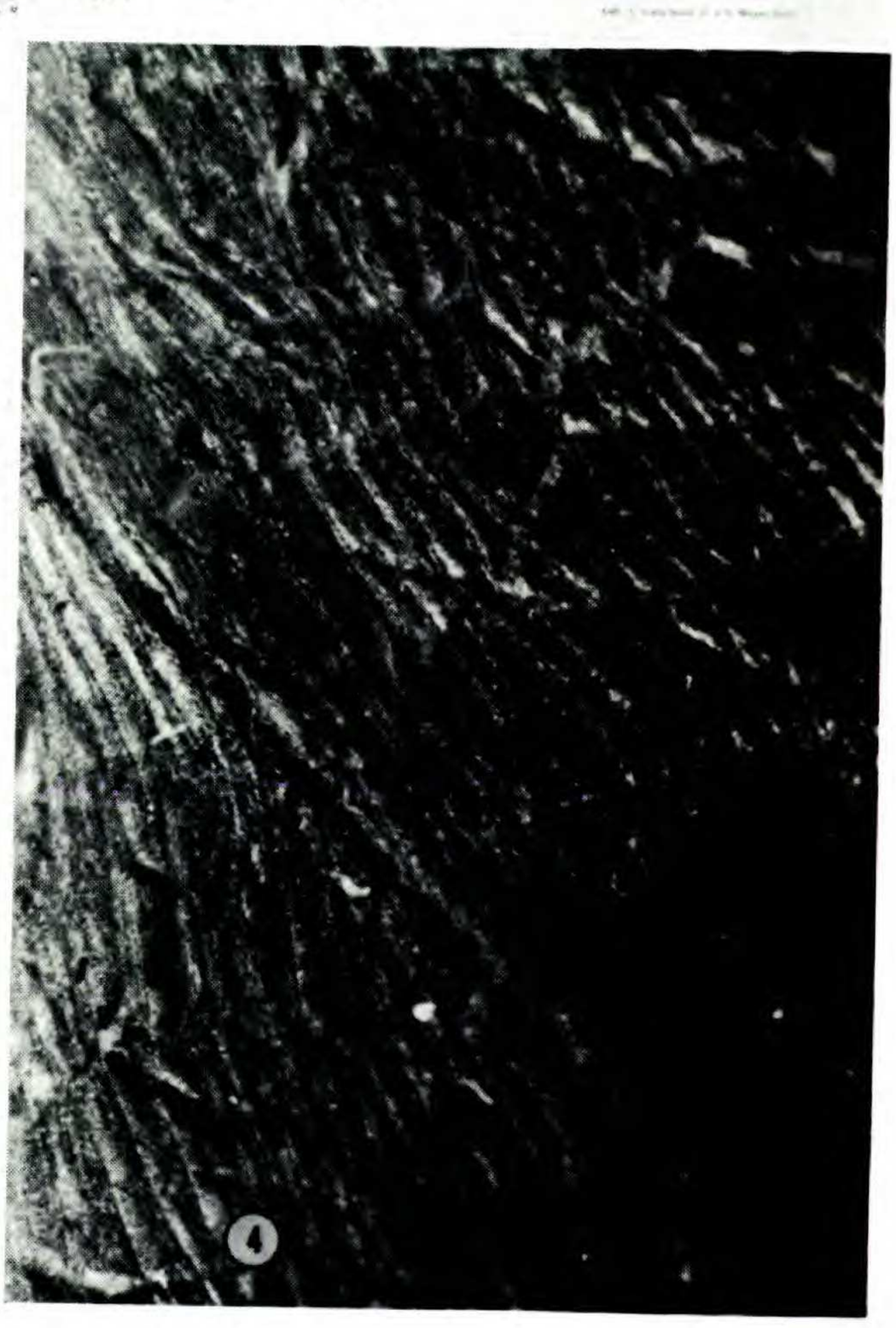
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C. multiflora (A. C. Smith) D'Arcy, *comb. nov.*

Weigeltia multiflora A. C. Smith, Bull. Torrey Bot. Club 60: 387. 1933.

C. chamaephyta (Diels) D'Arcy, *comb. nov.*

Weigeltia chamaephyta Diels, Notizblatt 15: 383. 1941.

No types of *Correlliana* were seen and no material was seen of the two last mentioned species, so no key is provided at this time. Only one sheet of *Correlliana schlimii* (*Lawrence 530*, Colombia) has been seen. In *C. schlimii* the inflorescence branches are much longer and the bractlets much smaller than in specimens from Central America identifiable as *C. spectabilis*.

In his recent treatment of the Myrsinaceae for the *Flora of Panama*, Lundell (1971) included two species under *Weigeltia*, *W. spectabilis*, which was illustrated and which is a species of *Correlliana*, and *W. panamensis* Standl. Lundell cited one specimen under each species, that of *W. panamensis* being the type of the species. Since Lundell's paper, several new collections of *Correlliana spectabilis* from Central America have come to light, mostly from pidgeon-holes labelled "*Clavija*-indets." The species is apparently common on Cerro Campana, a lowland peak some 50 km west of Panama City on the Pacific side of the isthmus. One such collection, *Croat 14700* (MO, Fig. 1), superficially matches *Weigeltia panamensis* in its short congested inflorescences, and it also superficially matches type photos of *W. simplex* and *W. sprucei*. Recourse to a hand lens discloses that it is quite distinct from these, and its singular appearance is due to its being pistillate, and the only such collection seen. In this species the two sexes display greater difference in the gross appearance of the inflorescence than in any other part of the plant except the gyneocium (see Figs. 1–3).

The Convergence of *Clavija* and *Correlliana*

The palmoid growth form, the hard, globose seeds, the racemose inflorescences, the sclerenchyma fibres beneath the leaf epidermis, and the dioecious sexual condition are much alike in *Correlliana* and most species of *Clavija*. Some writers (Solereder, 1899; Hooker, 1876; Pax, 1899) have considered the Theophrastaceae as a tribe of the Myrsinaceae, but more recently it has been considered a separate family. Appendages on the corolla, usually referred to as staminodes, distinguish the flowers of the Theophrastaceae, and histological details (from Metcalfe & Chalk, 1950) such as a dissected vascular system, absence of septate fibres, and secretory elements further support recognition of the family. Although glandular dots are present on the foliage, these are not like the black-punctate dots on most Myrsinaceae. Most Myrsinaceae, at least those in the tribe Myrsineae which includes *Weigeltia*, have curved embryos quite

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Figures 1–4. *Correlliana spectabilis* (Standl.) D'Arcy from Panama.—1. Pistillate plant in flower. [After *Croat 14700* (MO).]—2. Pistillate plant in fruit. [After *Smith & Smith 3346* (F).]—3. Staminate plant in flower. [After *Luteyn 1021* (DUKE).]—4. Leaf underside of *Croat 14700* (MO) showing subepidermal sclerenchyma fibres which run across the veins. [×12.]

TABLE 1. Species which commonly assume the street lamp form of palmoid growth habit. Some branch sparingly when they eventually reach the forest canopy. All are from rain forests and most from the tropics.

SPECIES	FAMILY	PLACE OF OCCURRENCE
Adeniscanthus fusciflorus Ducke	Rutaceae	Amazonian Peru
Asplenium nidus L.	Polypodiaceae	Java
Anthocleista nobilis G. Don	Loganiaceae	Tropical West Africa
Cespedezia macrophylla Seem.	Ochnaceae	Tropical America
Clavija spp. (Most of genus)	Theophrastaceae	Tropical America
Cyanea leptostegia A. Gray	Lobeliaceae	Hawaiian Islands
Delissea undulata Gaud.	Lobeliaceae	Hawaiian Islands
Dendroseris macrophylla D. Don	Compositae	Juan Fernandez
Dracaena sp.	Liliaceae	Old World tropics
Euphorbia valerii Standl.	Euphoribiaceae	Central America
Ficus pseudopalma Blanco	Moraceae	Philippines
Gustavia sp.	Lecythidaceae	Tropical America
Pausandra trianae Baill.	Euphorbiaceae	Tropical America
Pentagonia macrophylla Benth.	Rubiaceae	Panama
Phyllobotryon soyauxianum Baill.	Flacourtiaceae	Tropical West Africa
Plantago princeps Cham. & Schlecht.	Plantaginaceae	Hawaiian Islands
Potalia amara Aubl.	Loganiaceae	Tropical America
Sarcocephalus vanderguchtii de Willd	Rubiaceae	Tropical West Africa
Weigeltia sprucei (Hook. f.) Mez	Myrsinaceae	Tropical America

unlike those in the Theophrastaceae. Although these differences probably warrant recognition of two families, most writers consider them to be closely related. If the two families are closely related, it is not through a *Clavija-Correlliana* link. Apart from the manifest differences in flower and embryo which make such a junction seem unlikely, a link at this point between the two families would presume that at least one of the genera is primitive in its family. Features of *Clavija* strongly suggestive of advancement within the Theophrastaceae are the imperfect flowers, few ovules in many species, and the connate androecium. There is little about *Correlliana* to suggest it is primitive within the Myrsinaceae, while 3-merous flowers, dioecious plants, and subepidermal sclerenchyma fibres may all be considered specializations. *Clavija* is the most specialized genus in the Theophrastaceae, and *Correlliana* is not primitive in the Myrsinaceae. It is safe to say that these two genera represent converging end points in the evolution of two related families, and consequently, the street lamp sort of palmoid growth habit should be considered a specialization in these two cases. "Groups which have undergone parallel evolutionary change may well have been rather similar to begin with" (Cronquist, 1968), but before applying this reasoning to the case at hand, it is instructive to examine some other cases of similar growth form.

THE PALMOID GROWTH FORM

A few examples of species with the street lamp sort of palmoid growth are listed in Table 1. These examples have features in common. The leaves are large (more than 30 cm, often 70 cm or more long), somewhat coriaceous, oblanceolate or narrowly elliptic, entire or toothed but the teeth mostly low in profile; the leaf base is narrowed in the lower portion to an abrupt or indistinct junction

with a stout or indistinct petiole; the trunk is slender, mostly unbranched and may be few to many meters tall; and the crown may take the form of a dense ball of leaves. It is not unusual for juveniles and adults to have leaves of somewhat different shape, and in some species a drip tip is present.

From a systematic point of view some genera, *e. g. Clavija, Correlliana*, are made up of predominantly street lamp-like forms, but other cases are isolated instances in a diverse list of families. Some of the examples are from families commonly considered woody, while others, *e. g. Plantago, Cyanea*, are from families commonly considered herbaceous. The list includes ferns and monocots, where the stem structure is not homologous with the secondarily produced stems of the dicots. In distribution, some are found on continental mainlands and others on islands, but all are found in wet forests, and all are found in tropical rain forests except *Dendroseris* from cloud forests on temperate Juan Fernandez.

Richards (1966) noted that "a number of large rain-forest trees, which later have normally branched crowns, remain unbranched with their leaves crowded on to the last few centimeters of the stem until they are 6–7 m or more high, *e. g.* the South American *Sterculia puriens* and S. *rugosa*." A few pages further in the same work, he illustrated leaves of *Lophira procera* (Ochnaceae–West Africa) in which the sapling leaves appear like those of the palmoids cited here and the adult leaves are smaller and different in shape. Richards went on to say that while no satisfactory explanations have been advanced for the particular stresses under which these forms confer selective advantage, "the extraordinary similarity of the foliage among rain-forest trees of the most varied systematic affinities cannot be due to chance."

Although the palmoid growth and the unbranched, essentially entire leaved form considered here must be nearly as old as the tropical rain forest itself, the heterogeneous origin of the examples provided does not argue for any great antiquity for the bulk of the cases considered. If the flora of the tropical rain forest has been continuous from the early evolution of the angiosperms, we might expect many taxa numerous in species with this form throughout the older rain forest. A likely explanation is that the palmoid street lamp, or *Schopfbaum* form, is of short duration and is redeveloped from different taxa at different times.

In Carlquist's (1965) words, "a tree seedling in a forest encounters a difficulty: growing up into better-lit upper reaches of a forest, very shady conditions must at first be encountered," and he postulated: "*Sarcopygme*'s trunk branches only a few times—or not at all—certainly the most efficient way to reach the upperportions of a forest." Such a plant may have an advantage if it can bloom and fruit before reaching the canopy, and some of the palmoid species may be the product of such a nanophytism, precocious bloomers which never attain a "mature" structure. When the plant does reach the canopy, the unbranched form is of little apparent advantage, and in many forest species, branching begins as the plant approaches or reaches the canopy. In the absence of features selecting against branching in the canopy, species of more usual branching and leafing habit, which under the influences of the rain forest evolve toward branchlessness and large, oblanceolate leaves, are likely to retain their capacity for branching at maturity indefinitely, even if few individuals ever reach the canopy.

Even in cases where a species has apparently lost its capability for reaching the canopy and branching in it, it is not unreasonable to suppose that a change in conditions might lead to a "re-evolution" of branching growth. Oppenheimer and Lang (1969) have recorded that monkeys may stimulate branching in *Gustavia superba*.

Carlquist has made much of the belief that insular environments encourage the evolution of woody plants from herbaceous ancestors. Citing many examples, among which the Compositae, Lobeliaceae and Cruciferae are favored, he has argued for a situation where a herbaceous species from a temperate or seasonal environment when placed in an environment perpetually favorable for growth continues to grow without senescence until the stature of a tree is attained. He also supports Darwin's (1859) suggestion that in a community of herbs, a species "might readily gain an advantage by growing taller and taller and overtopping the other plants." There is some substance in both of these proposals, but neither is particular to islands. The Darwinian suggestion is more true of forests than herbaceous communities, and no other reason is so convincing to explain the height of tall forests anywhere in the world. The perpetual summer hypothesis elaborated by Carlquist is applicable to tropical, moist forests on continents as well as to insular environments. An important assumed difference is that islands are more open to introduction of new elements—have more unfilled niches—than continental communities and hence are more likely to host successful herbaceous introductions from non-equable regions. Of Carlquist's examples of trees with herbaceous or shrubby ancestry in insular sites, a number are trees and these are shaped like street lamps and are restricted to the tropical rain forest habitats on the islands. In Table 1, *Dendroseris*, *Cyanea*, and *Plantago* can be traced to groups familiar in other parts of the world as herbs; and *Euphorbia*, *Pausandra*, and *Sarcopygme* are traceable to forms very different from that of the species noted. It is likely therefore, that the palmoid street lamp growth form has arisen in at least two ways; as a form which appears when some herbaceous groups evolve into woody growth, and as a nanophytic form of forest trees which have found it unnecessary to reach the forest canopy.

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